ABSTRACT

The present invention includes a method for rapid haplotyping a DNA or RNA segment. Two or more target sites on a segment of DNA or RNA are labeled with separate distinguishable luminescent hybridization probes, where the targets are selected genetic markers. A dilute solution is formed containing the labeled DNA or RNA segments. Each DNA or RNA segment is illuminated with light beams effective to excite each luminescent hybridization probe, when present. The presence or absence of each luminescent hybridization probe on each DNA or RNA segment is detected to determine the haplotype of each DNA or RNA segment.